

Epiphytes on *Phoenix canariensis* in Dalmatia (Croatia)

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Epiphytes are a characteristic life form of perhumid tropical rain forests. In Mediterranean ecosystems epiphytic vegetation is restricted to some special habitats, just as in the temperate regions. An almost disregarded microhabitat for epiphytes exists in tourist centres in coastal regions around the Mediterranean Sea, where *Phoenix canariensis* is widely planted in coastal avenues. Remarkable are the epiphytes in the lower crown area of the palms, where the armpits of cut palm leaves form good growing places which have especially in winter half-year good water supply. There exist only some 3 papers on epiphytic vegetation on *Phoenix canariensis* (MAIRE 1942, RICHTER 1985, BRANDES 2001).



Fig. 1: Coastal avenue in Makarska (2006): epiphytes are only growing on *Phoenix canariensis*.

In 2006 the epiphytic vegetation on *Phoenix canariensis* was monitored in central and southern parts of Dalmatia (e.g. Split, Omiš, Baška Voda, Makarska, Dubrovnik). In total 42 species growing on *Ph. canariensis* were recorded growing on the upper part of the stems (see tab. 1). Contrary to Italy (RICHTER 1985) no spontaneous vegetation was found in the lower parts of the trunks (see fig. 1).



Fig. 2: *Parietaria judaica*, the most frequent epiphyte on *Phoenix canariensis*, in Baška Voda (2006).



Fig. 3: *Ficus carica*, the most frequent epiphyte on *Phoenix canariensis*, in Split (2006).

Tab. 1: Epiphytes on *Phoenix canariensis* in Dalmatia.

Locality	Baška Voda	Makarska	Split	Dubrovnik	Omiš	frequency
Number of trees investigated	31	37	8	2	1	
<i>Parietaria judaica</i>	26	13	7	2		60,8
<i>Ficus carica</i>	16	16	7			49,4
<i>Umbilicus horizontalis</i>		9	8			21,5
<i>Sonchus oleraceus</i>	8	7	2			21,5
<i>Pittosporum tobira</i>	9	4		2		19
<i>Cymbalaria muralis</i>	6	8				17,7
<i>Conyza sumatrensis</i>	7	5	1			16,5
<i>Antirrhinum majus</i>	1	2	6			11,4
<i>Geranium purpureum</i>	3	1	3			8,9
<i>Stellaria media</i> agg.	3	3	1			8,9
<i>Celtis australis</i>	5	1				7,6
<i>Phoenix canariensis</i> juv.	3	2				6,3
<i>Geranium rotundifolium</i>	4					5,1
<i>Bromus madritensis</i>	3					3,8
<i>Asparagus acutifolius</i>	1	2				3,8
<i>Hedera helix</i>	1	2				3,8
<i>Carex cf. distans</i>	2	1				3,8
<i>Asparagus cf. sprengeri</i>		2		1		3,8
<i>Hordeum leporinum</i>	2					2,5
<i>Pinus halepensis</i>	2					2,5
<i>Valantia muralis</i>	2					2,5
<i>Dittrichia viscosa</i>	1		1			2,5
<i>Oxalis corniculata</i>	1	1				2,5
<i>Solanum nigrum</i>	2					2,5
<i>Anthemis spec.</i>	1					1,3
<i>Arenaria serpyllifolia</i> agg.	1					1,3
<i>Dactylis hispanica</i>	1					1,3
<i>Daucus carota</i>	1					1,3
<i>Diplotaxis tenuifolia</i>	1					1,3
<i>Erodium chium</i>	1					1,3
<i>Nerium oleander</i>	1					1,3
<i>Thelygonum cynocrambe</i>	1					1,3
<i>Viburnum tinus</i>	1					1,3
<i>Oryzopsis miliacea</i>		1				1,3
<i>Polycarpon tetraphyllum</i>		1				1,3
<i>Catapodium rigidum</i>		1				1,3
<i>Lactuca serriola</i>		1				1,3
<i>Reichardia picroides</i>		1				1,3
<i>Campanula pyramidalis</i>				1		1,3
<i>Senecio bicolor</i>				1		1,3
<i>Oxalis tetraphylla</i>					1	1,3
<i>Satureja montana</i>					1	1,3



Fig. 4: *Umbilicus horizontalis* on *Phoenix canariensis* (Makarska 2006).

The most frequent species are *Parietaria judaica* (60,8 %; fig. 2), *Ficus carica* (49,4 %; fig. 3), *Umbilicus horizontalis* (21,5 %; fig. 4), *Sonchus oleraceus* (21,5 %) and *Cymbalaria muralis* (17,7 %). These species are often to be found in wall vegetation of the classes Asplenietaea and Stellarietea. All species are facultative epiphytes, no one is obligatory epiphytic.

The distribution of life forms is shown in fig. 5. Phanerophytes are *Celtis australis*, *Ficus carica*, *Nerium oleander*, *Pinus halepensis* and *Pittosporum tobira*.

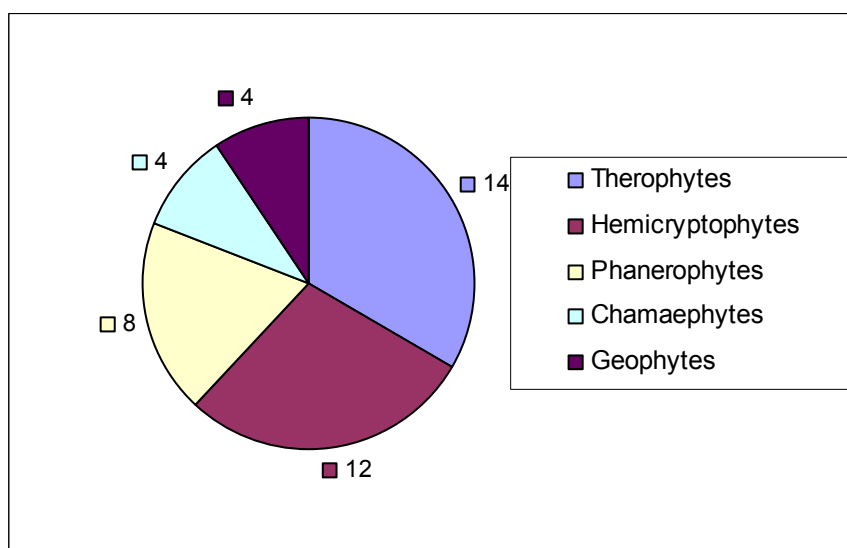


Fig. 5: Life forms of the epiphytes on *Ph. canariensis* in Croatia (2006).

Only 5 species are neophytic: *Phoenix canariensis* (young plants subsontaneous sometimes on planted palms), *Pittosporum tobira* (fig. 6), *Conyza sumatrensis*, *Asparagus cf. sprengeri* and *Oxalis tetraphylla*.



Fig. 6: *Pittosporum tobira* and *Parietaria judaica* on *Phoenix canariensis* (Dubrovnik 2006).



Fig. 7: *Celtis australis* on *Phoenix canariensis* (Baška Voda 2006).



Fig. 8: *Asparagus acutifolius* on *Phoenix canariensis* (Baška Voda 2006).



Fig. 9: *Campanula pyramidalis* on *Phoenix canariensis* (Dubrovnik 2006).

Tab. 2: Epiphytes on *Phoenix canariensis* in different regions

Area investigated	Dalmatia	Italy	Gozo	Sousse
Author	Brandes	Richter 1985	Brandes n.p.	Brandes 2001
Number of trees investigated	79	55	10	85
Aizoaceae indet.			x	
<i>Anthemis</i> spec.	x			
<i>Antirrhinum majus</i>	x			
<i>Arenaria serpyllifolia</i> agg.	x			
<i>Arisarum vulgare</i>			x	
<i>Asparagus acutifolius</i>	x	x		
<i>Asplenium onopteris</i>		x		
<i>Avena barbata</i>			x	
<i>Avena sterilis</i>			x	
<i>Bromus madritensis</i>	x	xx		
<i>Bromus spec.</i>			x	
<i>Campanula pyramidalis</i>	x			
<i>Cardamine hirsuta</i>		x		
<i>Carex distans</i>	x			
<i>Celtis australis</i>	x			
<i>Centranthus ruber</i>		x		
<i>Chenopodium album</i>				x
<i>Chenopodium giganteum</i>				x
<i>Chenopodium murale</i>				x
<i>Conyza bonariensis</i>		xx		x
<i>Conyza sumatrensis</i>	x	x		
<i>Cymbalaria muralis</i>	x	x		
<i>Dactylis hispanica</i>	x	x		
<i>Daucus carota</i>	x			
<i>Diplotaxis tenuifolia</i>				
<i>Dittrichia viscosa</i>		xx		
<i>Erodium chium</i>	x			
<i>Euphorbia peplus</i>		x		
<i>Ferula communis</i>			x	
<i>Ficus carica</i>	xxx			xx
<i>Ficus microcarpa</i>				x
<i>Galactites tomentosa</i>			x	
<i>Geranium molle</i>		x		
<i>Geranium purpureum</i>	x			
<i>Geranium robertianum</i> (?)		x		
<i>Hedera helix</i>	x			x
<i>Hordeum leporinum</i>	x			
<i>Hyoscyamus albus</i>				x
<i>Hyoseris radiata</i>		x		
<i>Lactuca serriola</i>	x			
<i>Lavatera cretica</i>			x	
<i>Lotus ornithopodioides</i>			x	
<i>Lycium europaeum</i>				x
<i>Mercurialis annua</i>				x
<i>Nerium oleander</i>	x			

Tab. 2 continued

Area investigated	Dalmatia	Italy	Gozo	Sousse
<i>Olea europaea</i>		x		
<i>Oxalis corniculata</i>	x	xx	x	
<i>Oxalis pes-caprae</i>		x		
<i>Oxalis tetraphylla</i>	x			
<i>Papaver</i>			x	
<i>Parietaria judaica</i>	xxx	xxx		x
<i>Phalaris canariensis</i>				x
<i>Phoenix canariensis</i>	x	x		
<i>Pinus halepensis</i>	x			
<i>Pipthaterum miliaceum</i>	x	x		
<i>Pittosporum tobira</i>	x			
<i>Polycarpon tetraphyllum</i>	x			
<i>Polygonum equisetiforme</i>				x
<i>Polypodium vulgare</i>		x		
<i>Prasium majus</i>			x	
<i>Prunus dulcis</i>		x		
<i>Raphanus raphanistrum</i>		x		
<i>Reichardia picroides</i>	x	x		
<i>Reseda alba</i>				x
<i>Rubia peregrina</i>		x		
<i>Rumex ulmifolius</i>		x		
<i>Satureja montana</i>	x			
<i>Scleropoa rigida</i>	x	x		
<i>Sedum dasyphyllum</i>		x		
<i>Sedum reflexum</i>		x		
<i>Senecio bicolor</i>	x			
<i>Sisymbrium irio</i>				x
<i>Solanum nigrum</i>	x	x	x	
<i>Sonchus oleraceus</i>	xx	xxx	xx	x
<i>Sonchus tenerrimus</i>			x	x
<i>Stellaria media</i> ssp. <i>cupaniana</i>		x		
<i>Stellaria media</i> ssp. <i>media</i>	x (s.l.)	xx		
<i>Stellaria pallida</i>		x		
<i>Thelygonum cynocrambe</i>	x			
<i>Umbilicus rupestris</i>	xx	x		
<i>Urospermum picroides</i>			x	
<i>Urtica dubia</i>		x		
<i>Valantia muralis</i>	x			
<i>Veronica cymbalaria</i>		x		
<i>Viburnum tinus</i>	x			
<i>Viola odorata</i>		x		

Frequency: x: 1-20 %, xx: 21-40 %, xxx: > 41 %

How can the diaspores reach the crowns of the trees? Anemochory and zoochory should be the most important way of spreading. Notable is the high number of zoochorous species: *Parietaria judaica*, the most frequent species, is myrmekochorous. *Ficus carica*, the second frequent species, is spread by birds.

Birds act presumably also as vector for *Pittosporum tobira*, *Celtis australis*, *Asparagus acutifolius* and *A. cf. sprengeri*. Others like *Sonchus oleraceus*, *Conyza sumatrensis* and *Senecio bicolor* are anemochorous. Autochory is of less importance: the only example is *Ph. canariensis* itself.

Epiphytic vegetation on *Ph. canariensis* is also characteristic for other towns in the Mediterranean region: Rabat (MAIRE 1942), Italy (RICHTER 1985), Sousse (BRANDES 2001). Tab. 2 shows the great diversity of the epiphytic vegetation on *Ph. canariensis*, some 85 species were recorded in only 4 regions. Only *Sonchus oleraceus* was found in all investigated areas. Own observations from Tunis yielded further therophytes. The development of epiphytic vegetation on *Ph. canariensis* depends clearly on sufficient precipitation: in semiarid areas no epiphytes are to be found.

MORICI (1998) pointed out, that *Ph. canariensis* harbours the most epiphytes of all species in the genus. He mentioned some Canarian endemics like *Sonchus congestus*, *S. acaulis*, *Aeonium urbicum*, *A. ciliatum*, *Polypodium cambricum subsp. Macaronesicum* and *Davallia canariensis* growing on *Ph. canariensis*. He cited observations carried out by HAROUN & DIE (1982) on Phoenix trunks of the historic palm avenue of Camino Largo (La Laguna, Tenerife). The authors found 31 species, most of them were introduced species.

Literature

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